PGP> IDC REUSE	MOVE SUMMARY SHEET FOR: 06004754 - 08/30/04	0019 (	Of 0034
Report Date/Time:			
Created TEXTFILE:	60047545.001		

Patenty Contains Text Only.

Warning [Pages Of US References:] page 7 has no references page 8 has no references page 9 has no references page 10 has no references page 11 has no references page 12 has no references Warning [Pages Of Foreign References:] page 1 has no references page 3 has no references page 4 has no references page 5 has no references page 6 has no references page 7 has no references page 8 has no references page 9 has no references page 10 has no references page 11 has no references page 12 has no references Warning [Pages Of Other References:] position 1 on page 12 may be a duplicate because the first 75 characters are the same as position 2 on page 12

Pat. No. 06004754 - 5

Issue Date: 08/30/04

Group ID: D

User ID: SXHolt KS: 12,523

Page 1

102

Pat. No. 06004754 - 5

Issue Date: 08/30/04

Group ID: D
User ID: SXHolt

Page 1

CHECK LIST

Rule 47 Continuing Data PCT Disclaimer

No ADS

No

Yes

Microfiche Appendix

CPA tag

No

No

Foreign Priority Claimed: No

Acknowledged: No

Text Endorsement: 10086197.030102

**JACKET** 

SERIAL NUMBER FILING DATE CLASS SUBCLASS GAU

10/086, 197

03/01/02

712 23

2154

FOREIGN PRIORITY

Country Document Number Date

DISCLAIMER

/ /

TITLE

Superscalar RISC instruction scheduling

MICROFICHE APPENDIX

ASSISTANT EXAMINER:

First: Middle: Last:

PRIMARY EXAMINER:

First: Middle: Last:

Larry D. Donaghue

CLAIMS ALLOWED Print

Pat. No. 06004754 - 5 Group ID: D Page 2 Issue Date: 08/30/04 User ID: SXHolt

19

DRAWINGS

Sheets Figures Print

11

BLUE SLIP INFORMATION

SERIAL NUMBER CLASS SUBCLASS GAU

Y

10/086,197 712. 23

INDEP. CLAIMS TOTAL CLAIMS

1,13 19

BLUE SLIP (Page 1)

INTERNATIONAL CLASSIFICATION

Class SubClass

G06F 9/38

CROSS-REFERENCES

Class SubClass

712 218;216

TERM EXTENSION

FIELD OF SEARCH

Class SubClass

23;218;217;216 712

OATH

INVENTOR NAME

Signed: First: Middle: Last:

Pat. No. 06004754 - 5 Group ID: D

Issue Date: 08/30/04

User ID: SXHolt

Page 3

Yes

Sanjiv

City:

Freemont

State: CA

ZIP Code:

Country:

Foreign ZIP:

INVENTOR NAME

First:

Middle:

Last:

Signed:

Kevin

Ray

Iadonato

Garg

Yes

City:

San Jose

State: CA ZIP Code:

Country:

Foreign ZIP:

INVENTOR NAME

First:

Middle:

Last:

Signed:

Le

Trong

Nguyen

Yes

City:

Monte Sereno

State: CA

ZIP Code:

Country:

Foreign ZIP:

INVENTOR NAME

First:

Middle:

Last:

Signed:

Yes

Johannes

Wang

City:

Redwood City

State: CA

ZIP Code:

Country:

Foreign ZIP:

PCT INFO

CONTINUING DATA (Page 1)

<u>LINE</u>	CODE	SERIAL NUMBER	FILING DATE	STATUS	DOCUMENT NO.	ISSUE DATE
104	71	09/906,099	07/17/2001	03 —		/ /
105	81	09/329,354	06/10/1999	01	6,289,433	/ /

Pat. No. 06004754 - 5 Group ID: D Page 4 Issue Date: 08/30/04 User ID: SXHolt 106 81 08/990,414 12/15/1997 01 5,974,526 107 81 08/594,401 01/31/1996 01 5,737,624 108 81 08/219,425 03/29/1994 01 . 5,497,499 109 81 07/860,719

03

03/31/1992

# REFERENCES (Page 1) SERIAL NUMBER: 10/086,197

1	U.S. REFERENCES U.S. Pat No.	Date	Patentee	Class	SubClass
	5,737,624	04/1998	Garg et al.	712	23
	4,574,349	03/1986	Rechtschaffen	712	209
	5,355,457	10/1994	Shebanow et al.	712	218
	5,448,705	09/1995	Nguyen et al.	712	228
	5,487,156	01/1996	Popescu et al.	712	217

### FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Popescu et al. The Metaflow Architecture pp. 10+13 B-63 (IEEE Micro, Jun. 1991.

# REFERENCES (Page 2) SERIAL NUMBER: 10/086,197 FORM 1449

U.S. REFERENCES U.S. Pat No.	Date	<u>Patentee</u>	Class	SubClass
4,626,989	12/1986	Torii —		
4,675,806	06/1987	Uchida		
4,722,049	01/1988	Lahti —		•
4,807,115	02/1989	Torng —		

Group ID: D

Pat. No. 06004754 - 5 Issue Date: 08/30/04 User ID: SXHolt

4,901,233	02/1990 Liptay
4,903,196	02/1990 Pomerene et al.
4,942,525	07/1990 Shintani et al.
4,992,938	02/1991 Cocke et al.
5,067,069	11/1991 Fite et al.

#### FOREIGN REFERENCES

Foreign Doc No.	<u>Date</u>	Country	Class	SubClass
0 515 166 A1	11/1992	EPX		
0 533 337 A1	03/1993	ЕРХ —	-	
WO 91/20031 A1	12/1991	WOX	•	

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Acosta, R. D. et al., +37 An Instruction Issuing Approach to Enhancing Performance in Multiple Functional Unit Processors, +38 +0 +i IEEE Transactions On Computers+1 , IEEE, vol. C-35, No. 9, Sep. 1986, pp. 815-828.

Agerwala, T. and Cocke, J., +i High Performance Reduced Instruction Set Processors+1 , IBM Research Division, Mar. 31, 1987, pp. 1-61.

Aiken, A. and Nicolau, A., +37 Perfect Pipelining: A New Loop Parallelization Technique\*,+38 +0 +i ESOP +3 88, 2nd European Symposium on Programming+1, Springer, ISBN 3-540-19027-9, 1988, pp. 221-235.

Butler, M. and Patt, Y., +37 An Improved Area-Efficient Register Alias Table for Implementing HPS, +38 +0 University of Michigan, Ann Arbor, Michigan, Jan. 23, 1990, 24 pages.

Page 5

Group ID: D
User ID: SXHolt

Page 6

Butler, M. et al., +37 Single Instruction Stream Parallelism Is

Greater Than Two, +38 +0 +i 18th Annual International Symposium on

Computer Architecture+1 , vol. 19, No. 3, ACM, May 1991, pp. 276-286.

# REFERENCES (Page 3) SERIAL NUMBER: 10/086,197

U.S. Pat No.	Date	Patentee	Class	SubClass
5,109,495	04/1992	Fite et al.		
5,142,633	08/1992	Murray et al.		
5,214,763	05/1993	Blaner et al.		
5,222,244	06/1993	Carbine et al.		
5,226,126	07/1993	McFarland et al.		
5,230,068	07/1993.	Van Dyke et al.		
5,251,306	10/1993	Tran		
5,261,071	11/1993	Lyon		
5,345,569	09/1994	Tran		

#### FOREIGN REFERENCES

DEFEDENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.)
Charlesworth, A.E., +37 An Approach to Scientific Array Processing:
The Architectural Design of the AP-120B/FPS-164 Family,+38 +0 +i
Computer+1, IEEE, vol. 14, Sep. 1981, pp. 18-27.

Colwell, R.P. et al., +37 A VLIW Architecture for a Trace Scheduling

Compiler, +38 +0 +i Proceedings of the 2nd International Conference on

Architectural Support for Programming Languages and Operating

Group ID: D
User ID: SXHolt

Page 7

Systems+l , IEEE Computer Society, Oct. 1987, pp. 180-192.

Dwyer, H., III, Ph.D., +i A Multiple, Out-of-Order, Instruction
Issuing System For Superscalar Processors+l , Dissertation for Cornell
University, UMI Dissertation Services, Aug. 1991, pp. iii-xvi and
1-249.

Foster, C.C. and Riseman, E.M., +37 Percolation of Code to Enhance Parallel Dispatching and Execution, +38 +0 +i IEEE Transactions On Computers+1, IEEE, Dec. 1972, pp. 1411-1415.

Gee, J. et al., +37 The Implementation of Prolog via VAX 8600
Microcode, +38 +0 +i International Symposium on Microarchitecture:
Proceedings of the 19th Annual Workshop on Microprogramming+l , ACM, 1986, pp. 68-74.

# REFERENCES (Page 4) SERIAL NUMBER: 10/086,197 FORM 1449

U.S. REFERENCES  U.S. Pat No.	<u>Date</u>	Patentee	Class	SubClass
<1,3>5,355,457	10/1994	Shebanow et al.		
5,398,330	03/1995	Johnson		
5,442,757	08/1995	McFarland et al.		
<1,4>5,448,705	09/1995	Nguyen et al.		
<1,5>5,487,156	01/1996	Popescu et al.		
5,497,499	03/1996	Garg et al.		
5,561, <sub>776</sub>	10/1996	Popescu et al.		
5,574,927	11/1996	Scantlin		

Group ID: D
User ID: SXHolt

Page 8

5,592,636

01/1997 Popescu et al.

## FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

Goodman, J.R. and Hsu, W., +37 Code Scheduling and Register Allocation in Large Basic Blocks, +38 +0 +i Proceedings of the 2nd International Conference on Supercomputing+1, ACM, 1988, pp. 442-452.

Gross, T.R. and Hennessy, J.L., +37 Optimizing Delayed Branches, +38 +0 +i Proceedings of the 5th Annual Workshop on Microprogramming+1 , IEEE & ACM, Oct. 5-7, 1982, pp. 114-120.

Groves, R.D. and Oehler, R., +37 An IBM Second Generation RISC Processor Architecture, +38 +0 +i Proceedings 1989 IEEE International Conference on Computer Design: VLSI in Computers and Processors+1, IEEE, Oct. 1989, pp. 134-137.

---------------

Horst, R.W. et al., +37 Multiple Instruction Issue in the NonStop Cyclone Processor, +38 +0 +i Proceedings of the 17th Annual International Symposium on Computer Architecture+1 , ACM, 1990, pp. 216-226.

Hwu, W. et al., +37 An HPS Implementation of VAX: Initial Design and Analysis, +38 +0 +i Proceedings of the Nineteenth Annual Hawaii International Conference on System Sciences+1 , 1986, pp. 282-291.

# REFERENCES (Page 5) SERIAL NUMBER: 10/086,197 FORM 1449

#### U.S. REFERENCES

Pat. No. 06004754 - 5

Issue Date: 08/30/04

Group ID: D
User ID: SXHolt

Page 9

U.S. Pat No.	Date	Patentee	Class	SubClass
5,625,837	04/1997	Popescu et al.		
5,627,983	05/1997	Popescu et al.		
5,708,841	01/1998	Popescu et al.		
<1,1>5,737 <u>,</u> 624	04/1998	Garg et al.		
5,768,575	06/1998	McFarland et al.		
5,778,210	07/1998	Henstrom et al.		
5,797,025	08/1998	Popescu et al.		
5,832,205	11/1998	Kelly et al.		
5,832,293	11/1998	Popescu et al.		

#### FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.)

Hwu, W. W. and Patt, Y.N., +37 Checkpoint Repair for High-Performance

Out-of-Order Execution Machines, +38 +0 +i IEEE Transactions On

Computers+l , IEEE, vol. C-36, No. 12, Dec. 1987, pp. 1496-1514.

Hwu, W. and Patt, Y.N., +37 Design Choices for the HPSm Microprocessor
Chip,+38 +0 +i Proceedings of the Twentieth Annual Hawaii
International Conference on System Sciences+1 , 1987, pp. 330-336.

Hwu, W.W. and Chang, P.P., +37 Exploiting Parallel Microprocessor
Microarchitectures with a Compiler Code Generator, +38 +0 +i
Proceedings of the 15th Annual International Symposium on Computer
Architecture+1 , IEEE, Jun. 1988, pp. 45-53.

Hwu, W. and Patt, Y.N., +37 HPSm, a High Performance Restricted Data Flow Architecture Having Minimal Functionality, +38 +0 +i Proceedings

Group ID: D User ID: SXHolt

Page 10

of the 13th Annual Symposium on Computer Architecture+l , IEEE, 1986, pp. 297-306.

Hwu, W. and Patt, Y.N., +37 HPSm2: A Refined Single-chip Microengine, +38 +0 Proceedings of +i HICSS-21-vol. I-Architecture+l , 1988, pp. 30-40.

### REFERENCES (Page 6) SERIAL NUMBER: 10/086,197 FORM 1449

#### U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

5,974,526 10/1999 Garg et al.

\*6,289,433

09/2001 Garg et al.

No issue date available.

# FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) +i IBM Journal of Research and Development+l , IBM, vol. 34, No. 1, Jan. 1990, pp. 1-70.

Johnson, W. M., +i Super-Scalar Processor Design+l , Dissertation for Stanford University, 1989, pp. ii-xiii and 1-134.

Jouppi, N.P. and Wall, D.W., +37 Available Instruction-Level Parallelism for Superscalar and Superpipelined Machines, +38 +0 +i Proceedings+13 3rd International Conference on Architectural Support for Programming Languages and Operating Systems+1 , ACM, Apr. 1989, pp. 272-282.

Pat. No. 06004754 - 5 Group ID: D Issue Date: 08/30/04

User ID: SXHolt

Page 11

Jouppi, N.P., +37 Integration and Packaging Plateaus of Processor Performance, +38 +0 +i International Conference of Computer Design+l, IEEE, Oct. 2-4, 1989, pp. 229-232.

Jouppi, N.P., +37 The Nonuniform Distribution of Instruction-Level and Machine Parallelism and Its Effect on Performance, +38 +0 +i IEEE Transactions on Computers+1 , IEEE, vol. 38, No. 12, Dec. 1989, pp. 1645-1658.

#### REFERENCES (Page 7) SERIAL NUMBER: 10/086,197 FORM 1449

# U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

# FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Keller, R.M., +37 Look-Ahead Processors, +38 +0 +i Computing Surveys+1 , ACM, vol. 7, No. 4, Dec. 1975, pp. 177-195.

Lam, M.S., +37 Instruction Scheduling For Superscalar Architectures, +38 +0 +i Annu. Rev. Comput. Sci+l ., Annual Reviews, Inc., vol. 4, 1990, pp. 173-201.

Lighter, B.D. and Hill, G., +37 The Metaflow Lightning Chip Set, +38 +0 +i COMPCON Spring +3 91 digest of papers+l , IEEE Computer Society Press, Feb. 25+13 Mar. 1, 1991, pp. 13-18.

Melvin, S. and Patt, Y., +37 Exploiting Fine-Grained Parallelism Through a Combination of Hardware and Software Techniques, +38 +0 +i

Group ID: D
User ID: SXHolt

Page 12

The 18th Annual International Symposium on Computer Architecture+1, vol. 19, No. 3, ACM, May 1991, pp. 287-296.

Murakami, K. et al., +37 SIMP (Single Instruction stream/Multiple instruction Pipelining): A Novel High-Speed Single-Processor Architecture, +38 +0 +i Proceedings of the 16th Annual International Symposium on Computer Architecture+1 , ACM, 1989, pp. 78-85.

# REFERENCES (Page 8) SERIAL NUMBER: 10/086,197 FORM 1449

### U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

### FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.)

Peleg, A. and Weiser, U., +37 Future Trends in Microprocessors:

Out-of-Order Execution, Speculative Branching And Their CISC Performance Potential+38 , IEEE, 1991, pp. 263-266.

Pleszkun, A.R. and Sohi, G.S., +37 The Performance Potential of Multiple Functional Unit Processors\*,+38 +0 +i Proceedings of the 15th Annual International Symposium on Computer Architecture+1, IEEE, Jun. 1988, pp. 37-44.

Pleszkun, A.R. et al., +37 WISQ: A Restartable Architecture Using

Queues, +38 +0 +i Proceedings of the 14th International Symposium on

Computer Architecture+1 , ACM, Jun. 1987, pp. 290-299.

Popescu, V. et al., +37 The Metaflow Architecture+38 , +i IEEE Micro+1

Pat. No. 06004754 - 5 Group ID: D Issue Date: 08/30/04

User ID: SXHolt

Page 13

, IEEE, Jun. 1991, pp. 10-13 and 63-73.

Smith, M.D. et al., +37 Boosting Beyond Static Scheduling in a Superscalar Processor, +38 +0 +i ACM SIGARCH Computer Architecture News+l , ACM, vol. 18, Issue 3, Jun. 1990, pp. 344-354. 

REFERENCES (Page 9) SERIAL NUMBER: 10/086,197 FORM 1449

U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Patt, Y.N. et al., +37 Critical Issues Regarding HPS, A High

Performance Microarchitecture, +38 +0 +i Proceedings of the 18th Annual Workshop on Microprogramming+1 , ACM, Dec. 3-6, 1985, pp. 109-116.

Patt, Y. et al., +37 Experiments with HPS, a Restricted Data Flow. Microarchitecture for High Performance Computers, +38 +0 +i COMPCON +3... 86 digest of papers+l , 1986, pp. 254-258.

Patt, Y.N. et al., +37 HPS, A New Microarchitecture: Rationale and Introduction, +38 +0 +i Proceedings of the 18th Annual Workshop on Microprogramming+l , ACM, Dec. 1985, pp. 103-108.

Patt, Y.N. et al., +37 Run-Time Generation of HPS Microinstructions From a VAX Instruction Stream, +38 +0 +i International Symposium on Mircharchitecture: Proceedings of the 19th Annual Workshop on Microprogramming+l , ACM, 1986, pp. 75-81.

Group ID: D
User ID: SXHolt

Page 14

Patterson, D.A. and Hennessy, J.L, +i Computer Architecture A

Quantitative Approach+l , Morgan Kaufmann Publishers, Inc., 1990, pp.

xi-xv, 257-278, 290-314 and 449.

# REFERENCES (Page 10) SERIAL NUMBER: 10/086,197

U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.)

Smith, J.E. and Pleszkun, A.R., +37 Implementation of Precise

Interrupts in Pipelined Processors, +38 +0 +i Proceedings of the 12th

Annual International Symposium on Computer Architecture+1 , IEEE, Jun.

1985, pp. 36-44.

Smith, M.D. et al., +37 Limits on Multiple Instruction Issue,+38 +0 +i Proceedings of the 3rd International Conference on Architectural Support for Programming Languages and Operating Systems+1 , ACM, Apr. 1989, pp. 290-302.

Sohi, G. S. and Vajapeyam, S., +37 Instruction Issue Logic For High-Performance, Interruptable Pipelined Processors, +38 +0 +i Proceedings of the 14+hu th +1 +i Annual International Symposium on Computer Architecture+1 , ACM, Jun. 2-5, 1987, pp. 27-34.

Swensen, J.A. and Patt, Y.N., +37 Hierarchical Registers for Scientific Computers, +38 +0 +i Conference Proceedings: 1988

Pat. No. 06004754 - 5 Group ID: D
Issue Date: 08/30/04 User ID: SXHolt

User ID: SXHolt

Page 15

International Conference on Supercomputing+1 , ICS, Jul. 4-8, 1988, pp. 346-353.

Thornton, J.E., +i Design of a Computer: The Control Data 6600+1, Control Data Corporation, 1970, pp. 58-140.

#### REFERENCES (Page 11) SERIAL NUMBER: 10/086,197 FORM 1449

### U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

# FOREIGN REFERENCES

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Tjaden, G.S. and Flynn, M.J., +37 Detection and Parallel Execution of Independent Instructions, +38 +0 +i IEEE Transactions On Computers+l , IEEE, vol. C-19, No. 10, Oct. 1970, pp. 889-895.

Tjaden, G.S. and Flynn, M.J., +37 Representation of Concurrency with Ordering Matrices, +38 +0 +i IEEE Transactions On Computers+1 , IEEE, vol. C-22, No. 8, Aug. 1973, pp. 752-761.

Tjaden, G.J., +i Representation and Detection of Concurrency Using Ordering Matrices+1 , Dissertation for The Johns Hopkins University, UMI Dissertation Services, 1972, pp. 1-199.

Tomasulo, R.M., +37 An Efficent Algorithm for Exploiting Multiple Arithmetic Units, +38 +0 +i IBM Journal of Research and Development+1 , International Business Machines Corporation, vol. 11, No. 1, Jan. 1967, pp. 25-33.

Pat. No. 06004754 - 5 Group ID: D Issue Date: 08/30/04

User ID: SXHolt

Page 16

Uht, A.K., +37 An Efficient Hardware Algorithm to Extract Concurrency From General-Purpose Code,+38 +0 +i Proceedings of the 19th Annual Hawaii International Conference on System Sciences+1 , vol. I, University of Hawaii, 1986, pp. 41-50.

#### REFERENCES (Page 12) SERIAL NUMBER: 10/086,197 FORM 1449

### U.S. REFERENCES

U.S. Pat No. Date Patentee

Class SubClass

# FOREIGN REFERENCES

Jan. 1992, pp. 17-28.

Foreign Doc No. Date Country Class SubClass

OTHER REFERENCE CITATIONS (incl. Author, Title, Date, Pertinent Pages, etc.) Uvieghara, G.A. et al., +37 An Experimental Single-Chip Data Flow CPU,+38 +0 +i IEEE Journal of Solid-State Circuits+1 , vol. 27, No. 1,

Uvieghara, G.A. et al., +37 An Experimental Single-Chip Data Flow CPU,+38 +0 +i Symposium on ULSI Circuits Design Digest of Technical Papers+l , May 1990, 2 pages.

Wedig, R.G., +i Detection of Concurrency In Directly Executed Language Instruction Streams+l , Dissertation for Stanford University, UMI Dissertation Services, Jun. 1982, pp. ii, iii, v, vii-xv and 1-179.

Weiss, S. and Smith, J.E., +37 Instruction Issue Logic in Pipelined Supercomputers, +38 +0 +i IEEE Transactions on Computers+1 , IEEE, vol. C-33, No. 11, Nov. 1984, pp. 1013-1022 (77-86).

Wilson, J.E. et al., +37 On Tuning the Microarchitecture of an HPS

Group ID: D User ID: SXHolt

Page 17

Implementation of the VAX,+38 +0 +i MICRO 20: Proceedings of the 20th Annual Workshop on Microprogramming+1 , ACM SIGMICRO and IEEE CS TC-MICRO, Dec. 1-4, 1987, pp. 162-167.

\*\*\*\*\*